

[COMMUNICATION]

A Chromosomal Study on the Genus *Chymomyza* (Diptera: Drosophilidae) from Northern Japan

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ABSTRACT—The karyotypes of four drosophilid species of the genus *Chymomyza*, *fuscimana*, *distincta*, *caudatula* and *costata*, are studied by brain cell-Giemsa staining technique. They show the same number of diploid chromosomes, $2n=8$, consisting of two pairs of relatively large metacentric autosomes, one pair of microchromosomes and one pair of sex chromosomes, excepting two pairs of submetacentric autosomes in *Ch. caudatula*.

INTRODUCTION

As Clayton and Guest [1] have stated, chromosomal studies on genera other than the genus *Drosophila* are quite limited in the family Drosophilidae. Within the genus *Chymomyza*, only six species of about fifty have hitherto been studied karyologically [1-3], most of which are distributed in the New World. This is partly due to a difficulty in the maintenance of laboratory culture. We have examined metaphase chromosomes with brain cells of four species of the genus *Chymomyza* from northern Japan.

MATERIALS AND METHODS

All of the species were collected in timberyards at Sapporo in June and July, 1990, and their females were allowed to oviposit in glass vials with malt-yeast-sucrose medium. Preparations of mitotic chromosomes were made with neuroblasts of the 3rd larvae treated with 0.1 mg/ml of colchicine solution, and stained with 4% Giemsa solution [4]. More than 30 metaphase configurations (usually 50) were observed in each species.

RESULTS AND DISCUSSION

Figs. 1a-d show metaphase configurations of *Chymomyza fuscimana* (Zetterstedt), *distincta* (Egger), *caudatula* Oldenberg and *costata* (Zetterstedt), respectively. The former two species belong to the *fuscimana* species-group and the latter two species to the *costata* species-group [2]. *Ch. fuscimana* showed two pairs of relatively large metacentric (V-shaped) autosomes, one pair of microchromosomes (dots) and one pair of sex chromosomes, and both X and Y chromosomes are telocentric (rod-shaped). *Ch. distincta* showed the same karyotype as *Ch. fuscimana*, except for its smaller Y chromosome. The karyotype of *Ch. caudatula* was composed of two pairs of submetacentric autosomes, one pair of dots, and relatively long telocentric X and Y chromosomes. *Ch. costata* possessed four pairs of chromosomes: two pairs of V-shaped autosomes, one pair of dots and one pair of sex chromosomes (acrocentric X and submetacentric Y). The present result is consistent with that of Hackman and his colleagues [5], who have examined the karyotype of a Finnish strain of this species.

Throckmorton [6] has hypothesized that the genus *Chymomyza* might have derived from the way of Sophophoran radiation, together with the

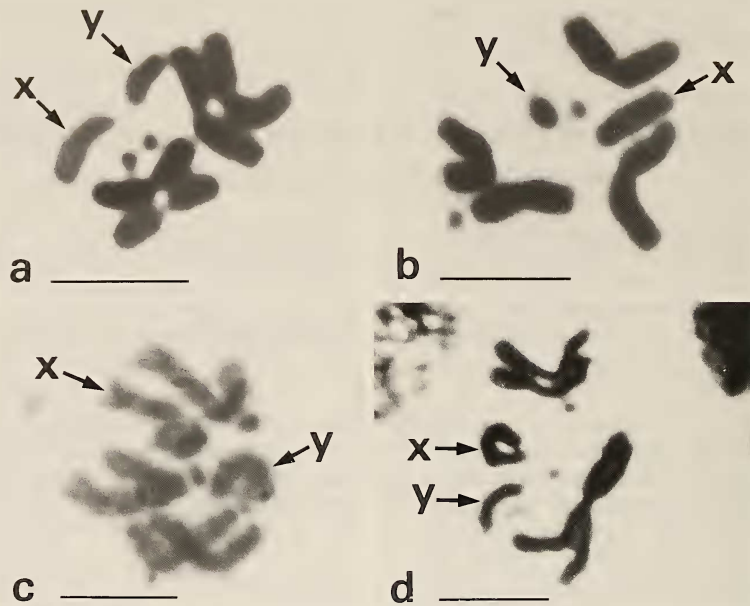


FIG. 1. Male metaphase chromosomes in brain cells of four *Chymomyza* species. a, *Ch. fuscimana*; b, *Ch. distincta*; c, *Ch. caudatula*; d, *Ch. costata*. Bar: 5 μ m.

melanogaster and other species-groups of the subgenus *Sophophora* of the genus *Drosophila*. *Chymomyza* is a compact group of the subfamily Drosophilinae and can be clearly distinguished from other taxonomic groups by the diagnostic characters [2]. Further, the basic chromosome pattern is the same (2V+1R+1D) in most of the species of this genus examined so far [1], although chromosomal information is still too scanty. A similar karyotype has been observed in the *melanogaster* species-group, and this chromosomal affinity might support, to some extent, the taxonomic position of the genus *Chymomyza* in the Throckmorton's phylogenetic tree [5, 6].

On the other hand, the recent cladistic analyses making use of immunological techniques [7] and electron microscopes [8] have demonstrated a far distant relationship between the genus *Chymomyza* and the *melanogaster* species-group. These data indicate that a detailed study on polytene chromosomes as well as metaphase configurations is necessary to establish the systematic position of the genus *Chymomyza* itself, or to trace the chromosomal phylogeny of the members of this group.

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